

The Pygmy Shrew, *Sorex hoyi winnemana*
(Insectivora: Soricidae), from the Coastal Plain
of North Carolina

THOMAS M. PADGETT

North Carolina Wildlife Resources Commission

Route 2, Box 583A

Elizabethtown, North Carolina 28337

AND

ROBERT K. ROSE

Department of Biological Sciences

Old Dominion University

Norfolk, Virginia 23529-0266

ABSTRACT—*Sorex hoyi winnemana* from two counties in extreme northeastern North Carolina represent the first documented specimens of pygmy shrews from the Coastal Plain and the first collected in North Carolina in 50 years. The 15 pygmy shrews were collected from a variety of habitat types, ranging from shrubby-grassy fields in ditched peaty wetlands to managed pine plantations and upland hardwood forests.

The smallest of the North American long-tailed shrews (genus *Sorex*) is *Sorex hoyi*, aptly named the pygmy shrew. At 2–3 g with a total length of 70–86 mm, of which 25–33 mm is tail, the pygmy shrew is the smallest mammal in North Carolina and among the world's smallest mammals. The masked shrew (*Sorex cinereus*) and the southeastern shrew (*S. longirostris*) are similar in appearance and in proportions, but both are somewhat larger (Webster et al. 1985). Besides having slightly longer bodies and tails, *S. cinereus* and *S. longirostris* have five prominent unicuspid, whereas the pygmy shrew has only three distinct unicuspid, the third and fifth being greatly reduced.

The pygmy shrew is distributed throughout the northern tier of states from Minnesota through Maine and extensively in Canada and Alaska, with fingers of distribution extending southward in the Rocky and Appalachian Mountains (Hall 1981), which suggests the animals need boreal conditions. However, studies involving the extensive use of pitfall traps have documented that *S. hoyi* is more widely distributed and occupies a wider range of habitats in the southeastern part of its geographic distribution than it does elsewhere. In Virginia, pygmy shrews have been found in at least 20 counties, including seven counties

west of the Blue Ridge where they were unknown before 1980 (Pagels 1987).

In North Carolina, the pygmy shrew is considered to be rare and of undetermined status (Webster 1987), in part because only three specimens, all from the extreme western mountainous region of the state, have been found. Of these, two specimens are from Bent Creek (23 April 1928), Buncombe County, and the other (6 September 1941) from Newfound Gap in nearby Swain County (Webster 1987).

During extensive studies of the southeastern shrew in the vicinity of the Great Dismal Swamp National Wildlife Refuge (Refuge) of southeastern Virginia and northeastern North Carolina from 1986–91, we collected *Sorex hoyi* from Camden and Gates counties, in extreme northeastern North Carolina. These represent the first documented specimens of *Sorex hoyi* from North Carolina in nearly 50 years, as well as the first of this species from the Coastal Plain (Lee et al. 1982).

METHODS

We used pitfall traps, consisting of #10 metal cans sunk flush into the ground and half-filled with water, to collect small mammals. Pitfall traps are very effective in trapping small cryptic mammals such as shrews (Padgett 1991). These traps offer advantages in that they do not need to be checked daily, are relatively maintenance free, and capture small shrews (and some other species of small mammals) that normally are difficult to collect in other traps. We placed pitfall traps in transects along roads and trails at measured intervals or in 0.25-ha grids spaced 12.5 m apart in 5 × 5 arrays. Each transect or grid was trapped for 3–4 weeks.

One Gates County site was located along Weyerhaeuser Ditch in the Refuge 2 km north of Highway 158, and the other was a transect extending from the escarpment on the western boundary of the Refuge into the swamp. This transect was located 2 km northeast of the intersection of Route 32 and State Route 1332. The Camden County grids were located on a large tract 9 km east–northeast of South Mills.

RESULTS AND DISCUSSION

We collected 15 *Sorex hoyi*, referable to *S. h. winnemana*, during the course of our survey, nine from the southern section of the Refuge in Gates County and six outside the Refuge on three grids in Camden County. Within the Refuge, eight animals were collected from the site adjacent to Weyerhaeuser Ditch. This site was located in an

upland (or mesic) area of the Dismal Swamp locally referred to as "mesic islands"; these are remnant Pleistocene marine deposits oriented in east-west directions. In contrast to the surrounding bottomland forest of tupelo (*Nyssa aquatica*), red maple (*Acer rubrum*), and scattered bald cypress (*Taxodium distichum*), these "island" habitats have such species as American beech (*Fagus grandifolia*), swamp chestnut oak (*Quercus michauxii*), blackgum (*Nyssa sylvatica*), and loblolly pine (*Pinus taeda*). The remaining specimen from the Refuge was collected along the Nansemond (or Suffolk) Escarpment, a Pleistocene feature that delineates the western boundary of the Dismal Swamp, in a transitional wetland forest composed of both upland and bottomland species.

The six pygmy shrews from Camden County were taken in a variety of habitats, all with black peaty loam soils, sometimes with some sand component. Five pygmy shrews came from recently (<2 years) clearcut sites regenerating mostly in mixed grasses and a few shrubs, and one was collected from a 15-year-old loblolly pine plantation with pine straw as virtually the only ground cover.

The specimens from Gates County ranged from 64 to 81 mm (\bar{x} = 75.44 mm), whereas those from Camden County ranged from 78 to 81 mm (\bar{x} = 79.67 mm). In the Gates County specimens, the tails averaged 36% of total length, compares to 33% in the Camden County specimens. Although the sex of some individuals could be determined, we were unable to establish useful sex ratios. Other shrews caught at one or more sites yielding pygmy shrews include the Dismal Swamp southeastern shrew, (*Sorex longirostris fisheri*), the short-tailed shrew (*Blarina brevicauda*) and in Camden County, the least shrew (*Cryptotis parva*).

As is typical of studies using pitfall traps in Virginia (John Pagels, Virginia Commonwealth University and Kurt Buhlman, Virginia Natural Heritage Program, personal communication), the distribution of pygmy shrews appears to be patchy. For example, in Camden County pygmy shrews were caught on three of 10 grids, four on one site, and one on each of the others; seven other sites yielded none. In Gates County in the Refuge, pygmy shrews were taken from two of six sites in habitats that seemed comparable.

We verified that pygmy shrews occur in a range of habitats: we caught shrews in fields in early succession, maturing loblolly pines, and in mature deciduous forest. In the Refuge (Gates County), pygmy shrews were collected on slightly higher and better drained sites than the surrounding more typical Dismal Swamp forested swampland dominated by tupelo, red maple, and bald cypress. The Camden County site is located in the Pasquotank River drainage, and therefore is also

a part of the historic Dismal Swamp, but the land has been ditched, creating slightly drier conditions than probably prevailed there before development. John Pagels (personal communication), who has used pitfall traps in extensive studies in many counties in Virginia, has caught pygmy shrews in many different habitats but not in wetland habitat. In Virginia, Pagels (1987) has collected *Sorex hoyi* with six other soricid shrews, but not with *Blarina*. In conclusion, our studies indicate that in North Carolina, as elsewhere, pygmy shrews have patchy distributions in a range of habitats; they probably occur throughout much more of the state than is presently known.

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